

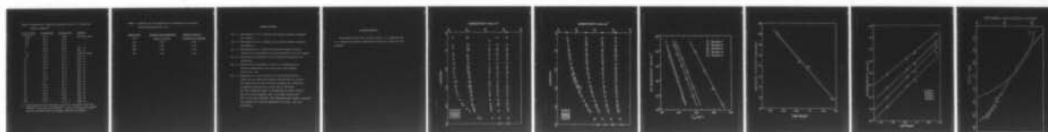
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CATHOLIC UNIV OF AMERICA WASHINGTON D C VITREOUS STA--ETC F/8 11/2  
INVESTIGATION OF PIEZOELECTRIC EFFECT IN PERMANENTLY POLARIZED --ETC(U)  
NOV 78 J H SIMMONS, M S CHU, C J SIMMONS N00014-75-C-0707

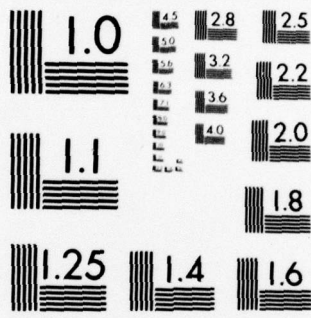
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MICROCOPY RESOLUTION TEST CHART  
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TABLE 2 Comparison of Empirical Equation, Eq.(2), to data from several authors.<sup>a</sup>

<u>Na<sub>2</sub>O content</u>	<u>ΔH measured</u>	<u>ΔH [Eqn.(2)]</u>	<u>Authors</u>
0.02	29.2	32.8	present paper
0.06	30.0	30.0	"
0.4	24.8	25.1	"
0.9	23.8	23.1	"
5	19.2	18.8	Ref. 13
5	30.5	18.8	Ref. 15
6.7	17.8	17.9	present paper
7.5	17.0	17.7	Ref. 12
10	17.8	17.0	Ref. 13
13	18.0	16.3	Ref. 15
15	16.2	16.0	Ref. 12
15	16.8	16.0	Ref. 13
15	18	16.0	Ref. 15
20	16.0	15.2	Ref. 13
20	17.5	15.2	Ref. 15
25	15.0	14.7	Ref. 13
25	17	14.7	Ref. 15
30	14.5	14.1	Ref. 12
30	14.1	14.1	Ref. 11
30	14.8	14.1	Ref. 13
30	16.5	14.1	Ref. 15
35	14.4	13.8	Ref. 13
40	12.4	13.4	Ref. 12
40	14.0	13.4	Ref. 13

a. Authors quoted are: Provenzano et al.<sup>11</sup>, Charles<sup>12</sup>, Otto and Milberg<sup>13</sup> and Hakim and Uhlmann<sup>15</sup>. Data of Redwine and Field<sup>14</sup> was not included because of phase separation problems.

TABLE 3 Exponent for the dependence of conductivity on sodium ion concentration (Eq. (3)).

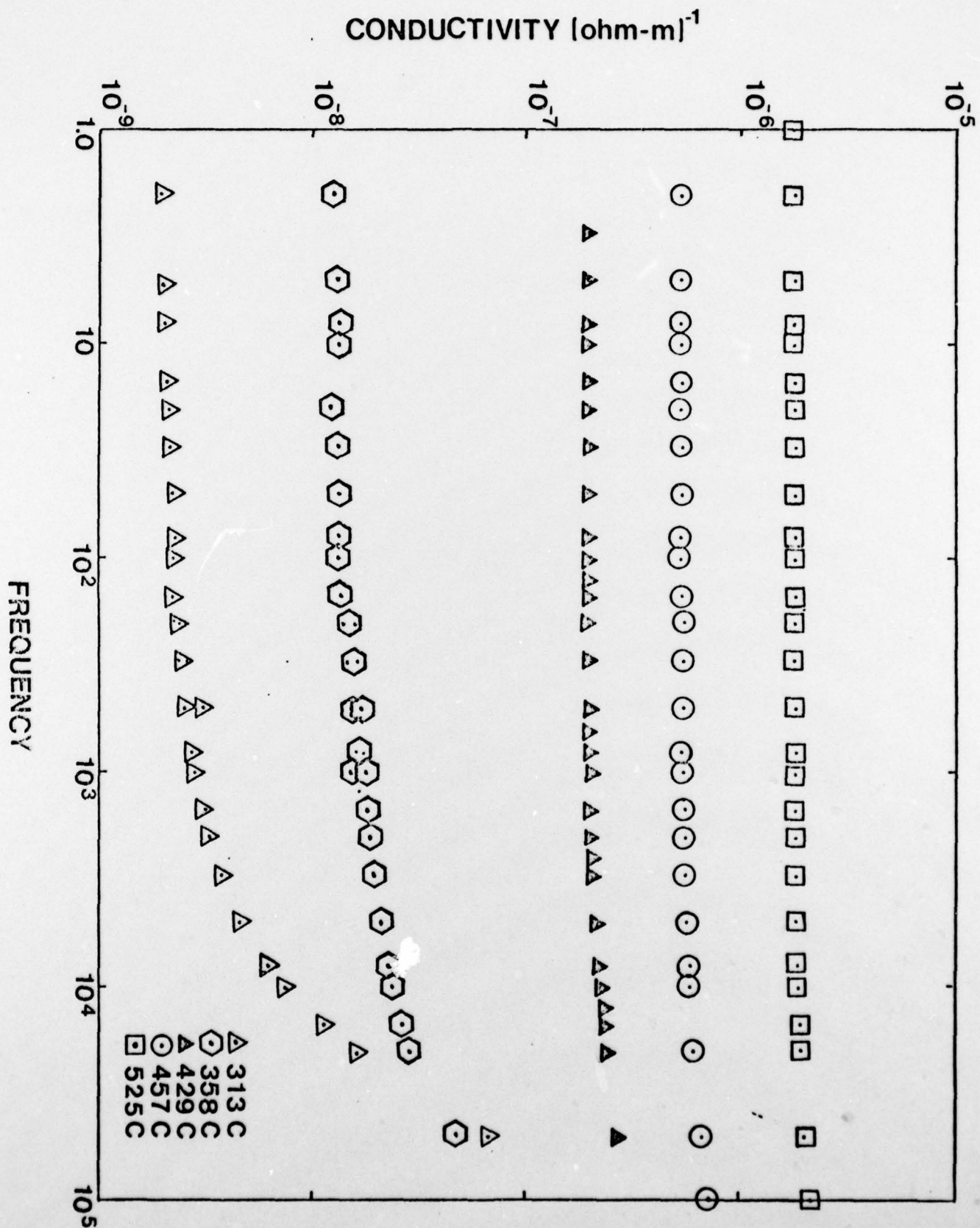
<u>Temperature</u> (°C)	<u>Exponent from dependence</u> <u>of <math>\ln \sigma</math> on <math>\ln c</math></u>	<u>Exponent from <math>\Delta H</math></u> <u>calculation: <math>2549/RT</math></u>
300	2.19	2.22
350	2.08	2.05
400	1.85	1.89
500	1.65	1.65

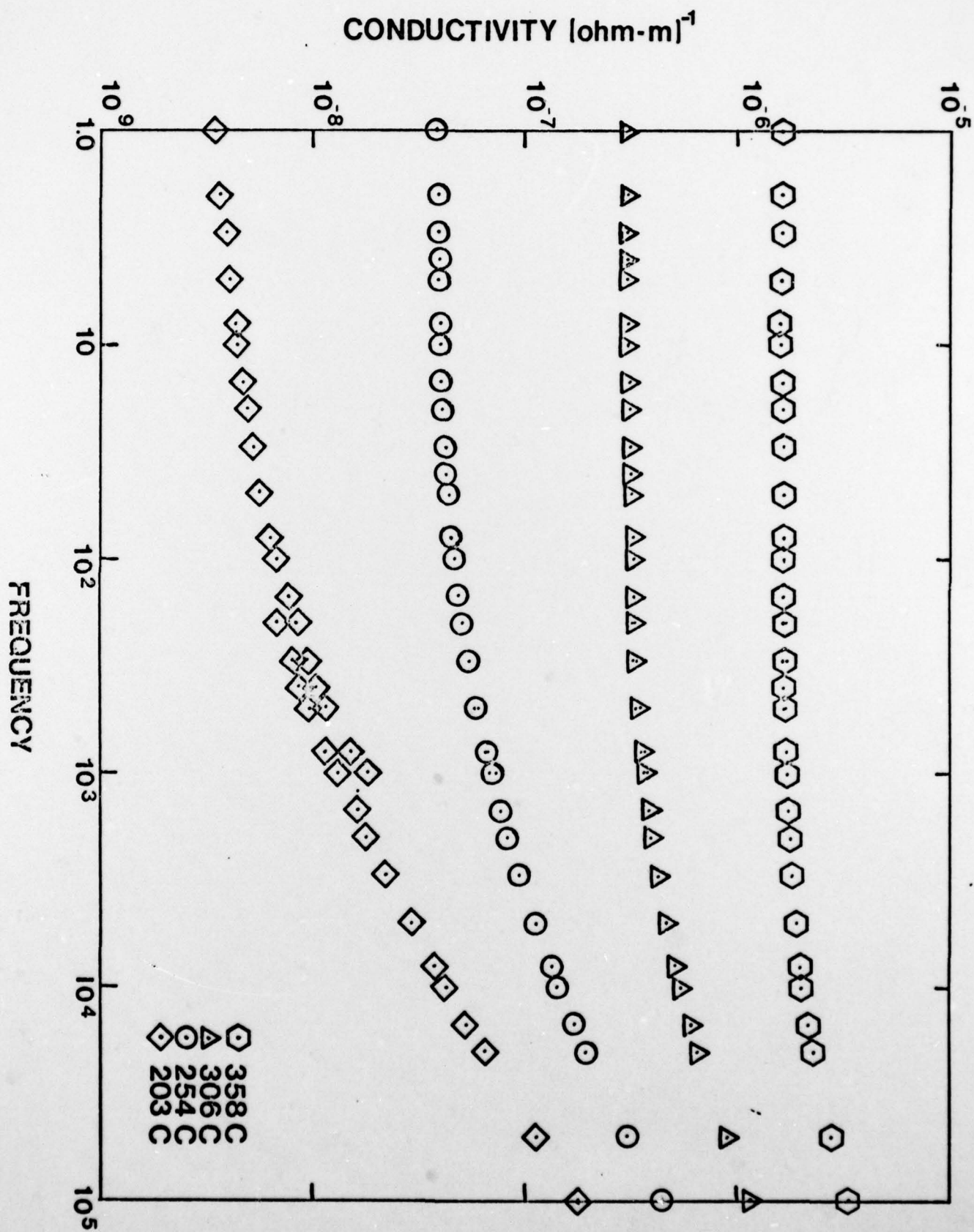
## FIGURE CAPTIONS

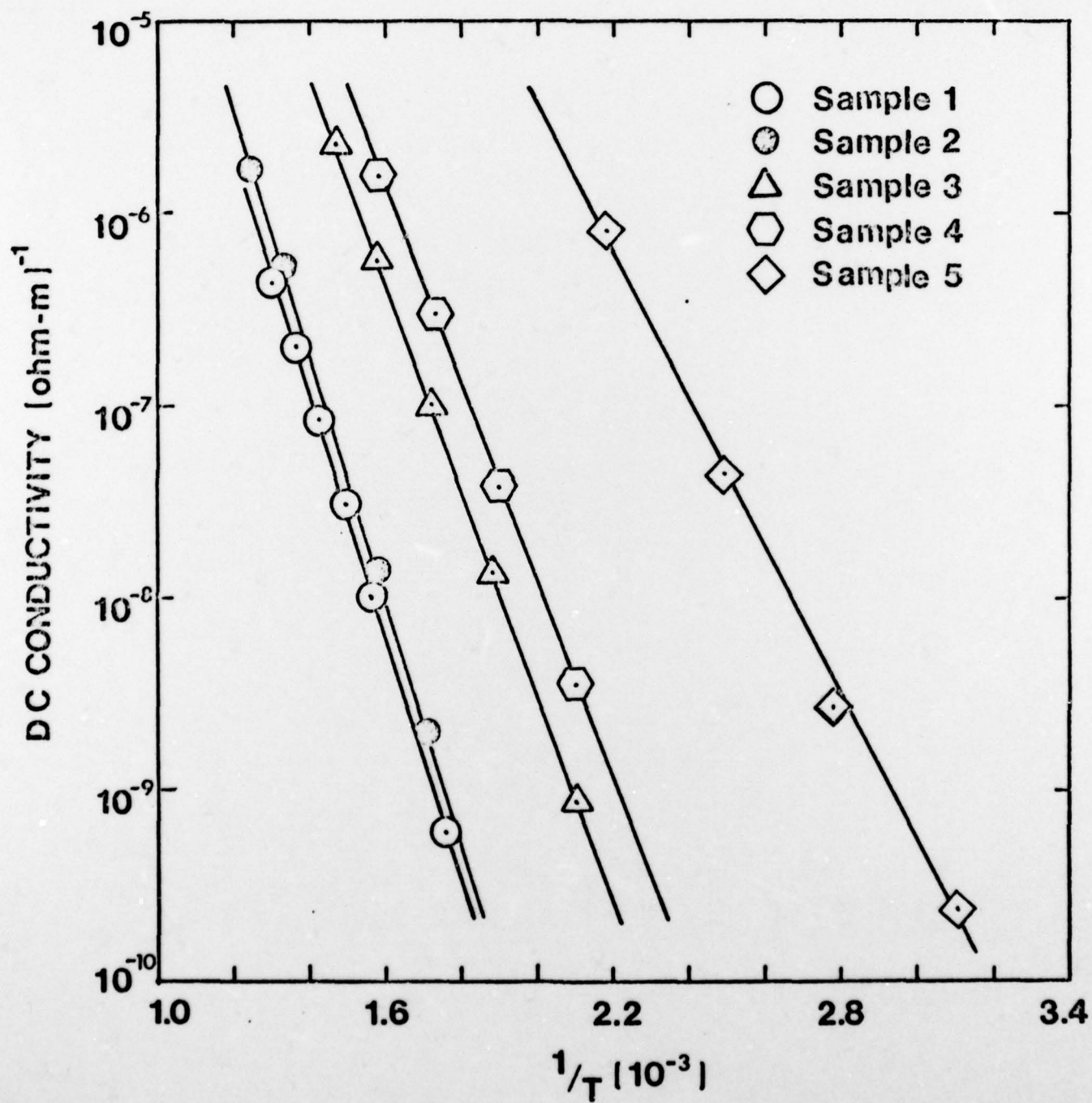
- Fig. 1 --Measurement of A.C. conductivity plotted against frequency for Sample 2.
- Fig. 2 --Measurement of A.C. conductivity plotted against frequency for Sample 4.
- Fig. 3 --Extrapolated D.C. conductivity plotted against inverse temperature to demonstrate Arrhenian behavior for all samples.
- Fig. 4 --Concentration dependence of the activation enthalpy for conduction.
- Fig. 5 --Concentration dependence of the D.C. conductivity at various temperatures. The slopes give the exponent  $a/RT$  in Eq. (3).
- Fig. 6 --Comparison of the suitability of the Anderson-Stuart model and the empirical equation derived here in fitting the dependence of the activation enthalpy for conduction on sodium concentration, from 0.06% to 40%  $\text{Na}_2\text{O}$ . The data from this paper is represented by solid circles, Ref. 11 by solid squares, Ref. 12 by open circles and Ref. 13 by open triangles. The Anderson-Stuart model is plotted as a dotted line and the empirical fit of Eq. (14) as a solid line.

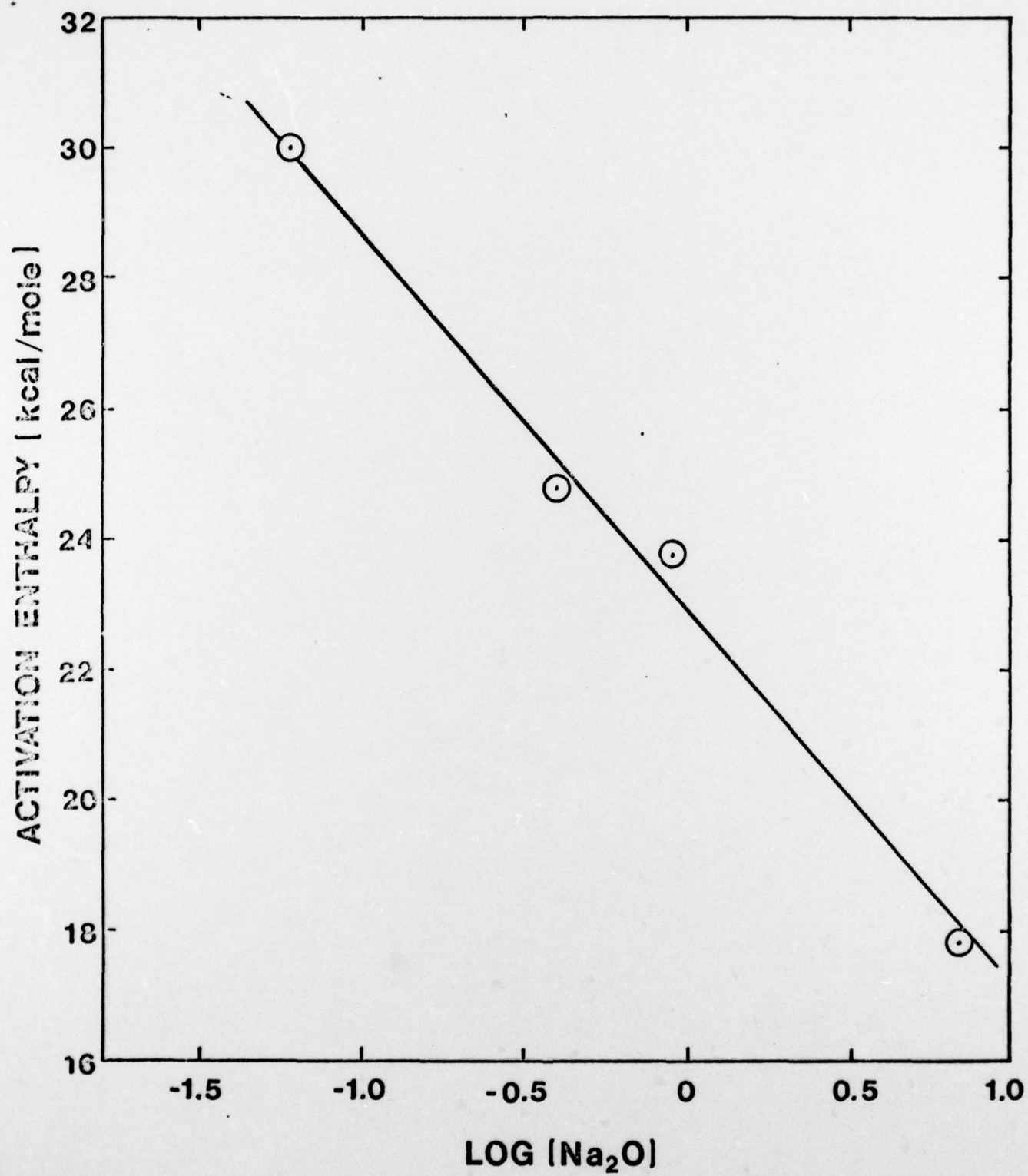
#### ACKNOWLEDGEMENTS

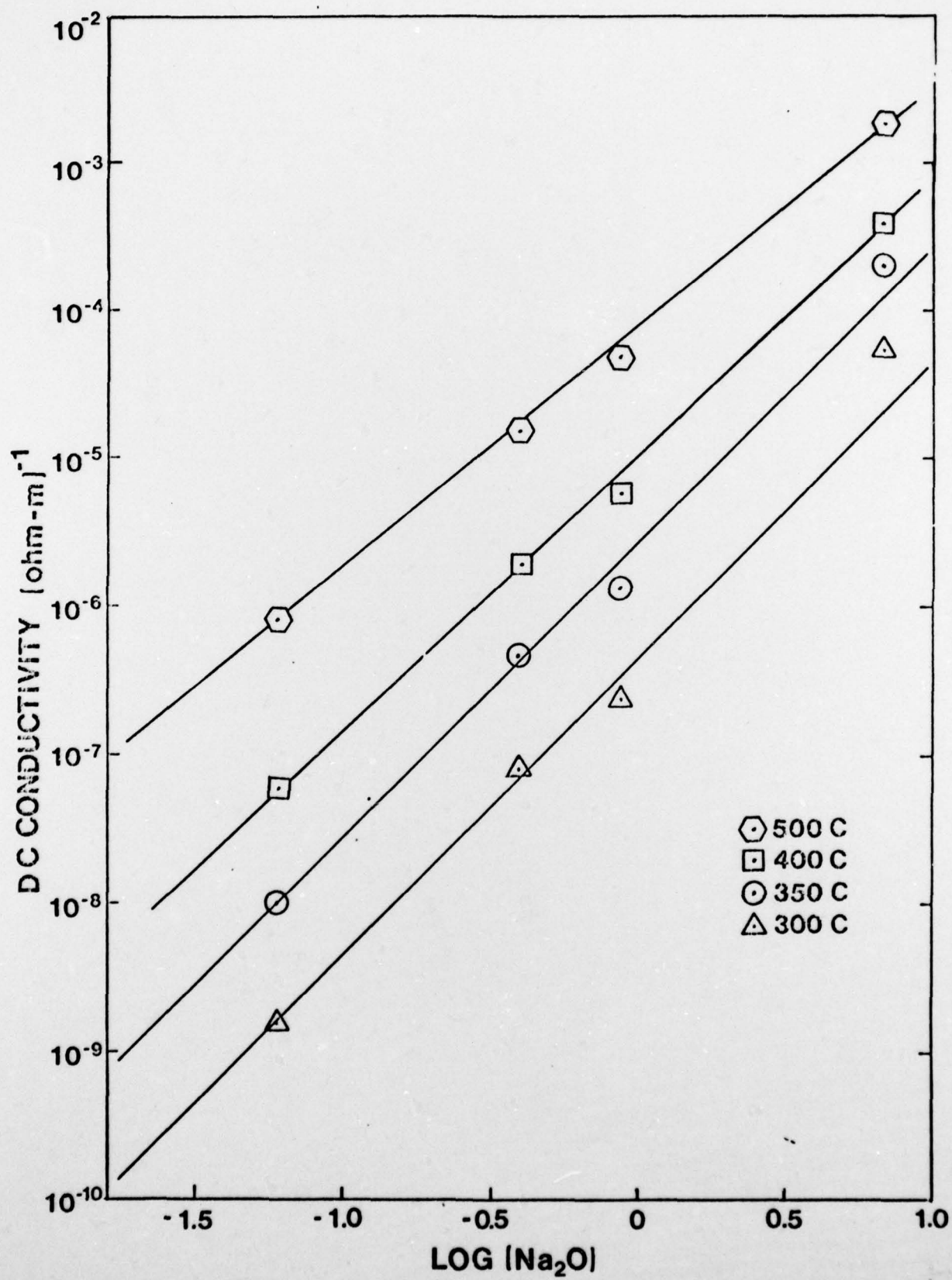
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# ACTIVATION ENTHALPY [kcal/mole]

